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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
09/022,834	02/13/98	DEGENDT	S 98.162

020306
MCDONNELL BOEHNEN HULBERT & BERGHOFF
300 SOUTH WACKER DRIVE
SUITE 3200
CHICAGO IL 60606

IM52/1107

EXAMINER	
AHMED, S	
ART UNIT	PAPER NUMBER
1746	25

DATE MAILED: 11/07/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

PTO-90C (Rev. 2/95)

Office Action Summary	Application No. 09/022,834	Applicant(s) DEGENDT ET AL.	
	Examiner Shamim Ahmed	Art Unit 1746	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 August 2001* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *27-39 and 41-60* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *27-39 and 41-60* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Response to Amendment

1. The declaration under 37 CFR 1.132 filed 8/24/01 is insufficient to overcome the rejection of claims 27-39,41-60 based upon Kern (Hand Book of Semiconductor Wafer Cleaning Technology) regarding the interchangeability of ozone and hydrogen peroxide as set forth in the last Office action because: First of all, it is known that hydrogen peroxide is used to remove organic contaminants along with additives. Applied reference Ilardi et al (5,466,389) teach that oxidizing agent hydrogen peroxide and the like is added to a composition to remove organic contaminants (col.4, lines 21-29). Further more, it is well known in the art that hydrogen peroxide and ozone are functionally equivalent and it is also known that ozone is more beneficial reactant as discussed by Kern in the Hand Book of Semiconductor wafer cleaning technology (pages 49-52 and page 601). Therefore, both ozone and hydrogen peroxide can be used for the same purpose. Applicants also state in the paragraph No.7 of the declaration that not every mixture of an inorganic acid (e.g. HCl) and hydrogen peroxide are capable of removing organic contaminants from silicon substrate. This statement is not relevant because nowhere in the rejection mention that the mixture of hydrogen peroxides and HCl is used to remove organic contaminants.

Response to Arguments

2. Applicant's arguments with respect to claims 27-39,41-60 under 35 USC 103 (a) have been considered because the primary reference (Sakon et al) concerns about the removal of metallic contaminants but are moot in view of the new ground(s) of rejection.

Claim Objections

3. Claim 42 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 42 depends on claim 41, whereas claim 41 depends on 27. So, claim 42 fails to further limit the subject matter of previous claim.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 27-28,30-39,41-43,47-49,51-57 and 60 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ilardi et al (5,466,389) in view of Kern (Hand Book of Semiconductor Wafer Cleaning Technology) and further in view of Sehested et al (J.Phys. Chem.).

Ilardi et al disclose an improved composition for cleaning substrates like silicon wafers immediately after fabrication, wherein the composition comprises nonionic surfactants, an additive such as acetic acid and an oxidizing agent such as hydrogen peroxide and the like to remove organic contaminants (col.1, lines 14-23, col.3, lines 35-col.4, lines 29

and example 6). Ilardi et al also teach that acetic acid or the additive can be used in the range of about 0.1 to about10% (col.2, lines 51-64). As to claims 28,30-32 and 54, Ilardi et al teach that the temperature of the composition is maintain between 50-90^0 C or at a temperature sufficient to clean the substrate (see, examples 1-3 and claim 38).

With the respect of claim 36: It would have been obvious to one having ordinary skill in the art at the time of claimed invention to optimize the same, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

Ilardi et al use hydrogen peroxide to remove contaminants but fail to teach ozone is used to remove contaminants from a substrate.

It would have been obvious to one having ordinary skill in the art to replace hydrogen peroxide with ozone because both are functionally equivalent as taught by Kern (page 52, line 2). As to claim 43, it would have been obvious that ozone bubbles are contacting the substrate having contamination because by nature ozone will create bubble in the solution.

With the respect of the claims limitation 33,47 and 55: It would have been obvious to one having ordinary skill in the art at the time of claimed invention to incorporate megasonic agitation during cleaning process because it is mostly commonly used particle removal techniques for silicon wafer cleaning as taught by Kern (page 420, paragraph no. 5.3). Therefore, it would have been obvious to one skill in the art at the time of claimed invention to combine Kern's teaching into Ilardi et al's method because

both hydrogen peroxide and ozone are functionally equivalent and also the megasonic agitation of the composition would provide effective removal of the contaminants as taught by Kern.

Ilardiet al remain silent about the additive, acetic acid is working as OH radical scavenger. It would have been obvious that the acetic acid acts as OH radical scavenger in aqueous ozone solution because it is well know stabilizer of aqueous ozone as taught by Sehested et al (see the introduction, page 1005).

Therefore, it would have been obvious to one skill in the art at the time of claimed invention to combine Sehested et al's teaching into modified Ilardi et al because acetic acid will stabilize ozone in the cleaning solution as taught by Sehested et al.

6. Claims 29,44-46,50 and 58-59 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ilardi et al (5,466,389) in view of Kern and Sehested et al (J.Phys.Chem.) as applied to claims 27,49 and 51 above, and further in view of Stanford et al (5,244,000).

Modified Ilardi et al discussed above in paragraph No.5 but fails to teach the rinsing step of the substrate after cleaning step and the liquid can be sprayed.

However, Stanford et al. describe a method for removing organic contaminants in which, liquid can be sprayed (col.9, lines 10-13).

Stanford et al. Further describe that after the substrate is treated for removal of contaminants, carbon dioxide is added to deionized water, which is applied to rinse or neutralize the treated substrate (col.7, lines 11-22).

Therefore, it would have been obvious to one skill in the art at the time of claimed invention to combine Stanford et al's teaching into modified Ilardi et al's method for effective removal of organic contaminants from a substrate as taught by Stanford et al.

Double Patenting

7. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

8. Claim 49 is rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 27 of U.S. Patent No. 09/207,546. Although the conflicting claims are not identical, they are not patentably distinct from each other because the concentration of additive claimed in the application No. 09/207,546 is within the range of the instant application.

9. Obviousness-type double patenting rejection of claims 27,51 and 60 are still effective as the previous Office action mailed 3/22/01 (see paragraph No.7 and 8). Applicant's response filed 8/24/01 is acknowledge that upon allowance of claims in the present application, applicants will submit a terminal disclaimer in the co-pending application.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Schevey et al (3,871,929) disclose a photoresist stripper that includes acetic acid (col.1, lines 63-65 or col.2, lines 11-15).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shamim Ahmed whose telephone number is (703) 305-1929. The examiner can normally be reached on M-Thu (7:00-5:30) Every Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski can be reached on (703) 308-4333. The fax phone numbers for the organization where this application or proceeding is assigned are (703)-305-7719 for regular communications and (703) 305-3599 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

SA
November 1, 2001

FRANKIE L. STINSON
PRIMARY EXAMINER
GROUP ~~2400~~ 1700